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Complete Specification Left, 14th June, 1900—Accepted, 4th Aug., 1900

PROVISIONAL SPECIFICATION.

Improvements in Vacuum Forming Apparatus, applicable for Medical and other Purposes.

I, JEAN FRANÇOIS (called Charles) BREUILLARD, of 5, Rue Coëtlogon, Paris, in the Republic of France, Doctor of Medicine, do hereby declare the nature of this invention to be as follows:—

This invention relates to an improved apparatus for forming a vacuum, which
5 is adapted for use in medicine and for industrial purposes.

Hitherto water injectors have only been employed for the formation of a vacuum when fixed upon a conduit of water under pressure, the water being constantly renewed; I have devised a plan for sending water under pressure into an injector by means of a pump of any suitable kind, in which the same water
10 returns to its point of departure, so as to form a closed and uninterrupted circuit.

In order that my invention may be readily and clearly understood, I have represented in the accompanying drawing, but by way of example only, the arrangement which forms the subject thereof.

Figure 1 is a longitudinal vertical section through the apparatus as a whole,
15 at the level of the axis of the three cylinders which are shewn.

Figure 2 is a plan view of the same, and

Figure 3 is a vertical cross-section.

In these figures similar letters of reference designate like parts.

As appears from the drawing, my apparatus consists in principle of two suction
20 and force pumps *k* arranged upon a base which forms a vessel *r* provided with a filling aperture *e*. The piston rod of each of these pumps is connected with a beam *l* terminating in handles *m* and pivoted at *i* upon the dome of a central closed cylinder *d*. Each of the pumps *k* is provided with a valve *c* upon one of the two apertures which are formed at its base and is continued by a pipe
25 extending to the bottom of the vessel *r*. The other aperture which is not provided with a valve, is the starting point of a tube, which, passing beneath the upper portion of the base vessel filled with water, opens into the central cylinder *d* at its entrance to which it is provided with a valve *c*¹.

The central dome or cylinder *d* is traversed throughout its length by a tube *t*
30 which starts at one centimetre from its base and passes out through the top of the dome where it is curved so as to form a swan-neck.

At the upper extremity of the swan-neck curve is fixed a water injector *h* the lower extremity of which traverses the upper wall of the base vessel at *q* and enters the water in the vessel to a depth of two or three centimetres. This
35 injector, the object of which is to form a vacuum, is provided with a socket *a* adapted for the reception of an india rubber tube placing the injector in communication with the vessel in which it is desired to create a vacuum. The injector may also be provided with a vacuum indicator.

In order to operate the apparatus it is only necessary to place the hands upon
40 the handles *m* and impart to the beam *l* a movement of oscillation around its

[Price 8d.]

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axis of rotation *i*. During the movement of descent of one of the pistons, the valve of the water supply tube *c* closes and the water contained in the pump cylinder is forced through the tube *n* into the central dome, raising the valve *c*¹; the other piston, in rising, sucks in water from the reservoir, this water entering the pump cylinder in raising the valve *c*, and so on alternately. 5

The air contained in the dome *d* is compressed in the upper part of this latter and acts by pressure upon the surface of the water which rises in the tube *t* and enters the injector *h* whence it again falls into the vessel *r* through the aperture *g*.

Under these circumstances, the movement of the water constitutes an uninterrupted circuit and with a very small quantity of water this circuit may be maintained, such water passing through the cones of the injector, produces a vacuum by carrying with it the air which is drawn into the socket *a*. 10

This being so, if this socket *a* be placed in communication with a cupping-glass for example by means of an india rubber tube *u*, this cupping-glass may 15 be applied over the whole surface of the body by moving it as desired, thus producing all the effects of the operation which I have termed pneumatic massage.

If this tube *u* is connected with a bell or closed vessel of any kind, a vacuum will be formed therein.

It will of course be understood that the form, dimensions, details and materials 20 employed in the construction of my apparatus may vary without in any wise affecting the principle of my invention. Thus for example the reciprocating movement of the two pistons may be converted into a circular movement and they may be operated by a motor of any suitable kind.

Dated this 14th day of September 1899. 25

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Agents for the Applicant.

COMPLETE SPECIFICATION.**Improvements in Vacuum Forming Apparatus, applicable for Medical 30
and other Purposes.**

I, JEAN FRANCOIS (called Charles) BREUILLARD, of 5, Rue Coëtlogon, Paris, in the Republic of France, Doctor of Medicine, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:— 35

This invention relates to an improved apparatus for forming a vacuum, which is adapted for use in medicine and for industrial purposes.

Hitherto water-ejectors have only been employed for the formation of a vacuum when fixed upon a conduit of water under pressure, and with constant supply. I have devised a plan whereby water under pressure is forced through an ejector, 40 by means of a pump of any suitable kind, and in which the same water returns to its point of departure, so as to form a closed and uninterrupted circuit.

In order that my invention may be readily and clearly understood, I have represented the same in the accompanying drawing, in which

Figure 1 is a longitudinal vertical section taken through the entire apparatus 45 in the axial plane of the three cylinders with which it is provided.

Figure 2 is a plan view, and

Figure 3 is a vertical cross-section, of the same.

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Figure 4 is a longitudinal vertical section of a slightly modified construction of apparatus.

Figure 5 is a horizontal section, and

Figure 6 is a transverse section of the same.

5 In all these figures the same letters of reference designate like parts.

As will be seen from the drawing, my apparatus consists broadly of two suction and forcing pumps *k* arranged upon a base which forms a vessel *r* provided with a filling aperture *e*. The piston rod of each of these pumps is connected with a beam *l* terminating in handles *m* and pivoted at *i* upon the dome of a central closed cylinder *d*. Each of the pumps *k* is provided with a valve *c* upon one of the two apertures which are formed at its base and is continued by a pipe extending to the bottom of the vessel *r*. The other aperture which is not provided with a valve, is the starting point of a tube which, passing beneath the upper portion of the base vessel filled with water, opens into the central cylinder *d* at its entrance to which it is provided with a valve *c*¹.

The central dome or cylinder *d* is traversed throughout its length by a tube *t* which leads from a point at about one centimetre above its base and passes out through the top of the dome, where it is curved into the form of a swan-neck.

At the upper extremity of the swan-neck is fixed a water ejector *h*, the lower extremity of which traverses the upper wall of the base vessel at *q* and enters the water in the vessel *r* to a depth of two or three centimetres. This ejector, the object of which is to exhaust the air and thereby produce the vacuum, is provided with a branch *a* adapted to receive an india rubber tube placing the ejector in communication with any vessel in which it is desired to create a vacuum.

25 The ejector may also be provided with a vacuum gauge or indicator.

In order to operate the apparatus it is only necessary to place the hands upon the handles *m* and impart to the beam *l* a movement of oscillation around its fulcrum *i*. During the descent of one of the pistons, the valve of the water supply tube *c* closes, and the water contained in the pump cylinder is forced through the tube *n* into the central dome, raising the valve *c*¹; the other piston is at the same time ascending, and water from the reservoir is thereby caused to enter its pump cylinder, raising the valve *c*, and so on alternatively.

The air contained in the dome *d* is compressed in the upper part of this latter and acts by pressure upon the surface of the water therein; which rises in the tube *t* and enters the ejector *h* whence it again falls back into the vessel *r* through the pipe *q*.

Under these circumstances, the movement of the water constitutes an uninterrupted circuit and with a very small quantity of water this circuit may be maintained, such water passing through the cones of the ejector, produces a vacuum by carrying with it the air drawn into the branch *a*.

This being so, if this branch *a* be placed in communication with a cupping-glass for example by means of an india rubber tube *u*, this cupping-glass may be applied over the whole surface of the body by moving it as desired, thus producing all the effects of the operation which I have termed pneumatic massage.

45 If this tube *u* is connected with a bell or closed vessel of any kind, a vacuum will be formed therein.

In the modification shown in Figures 4, 5 and 6 the suction and forcing pumps are replaced by elastic membranes or bells *b* of rubber or other convenient material.

50 These membranes or bells *b* are hermetically fixed to the base of the apparatus by means of rings *f* formed with lugs. These rings *f* may be constructed to receive, or be integral with, brackets *g* to which levers *o* are hinged for operating the bells *b*. Each lever is furnished with hinged claws *p* composed of two portions and reposing upon the bells. The stroke of the levers *o* which may be operated either with the hands or with the feet, is limited by stops *s* of rubber fixed upon the base *r*.

It is evident from the foregoing description that when the bells or membranes *b*

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are extended, as shown in Figures 4 and 6, and if then one of them is depressed by acting on the lever *o* the liquid contained therein, owing to suction, is forced into the cylinder *d* by compressing the rubber as will be readily understood. By lifting one lever the other becomes depressed and the bell in connection with the raised lever draws in water whilst the other bell discharges; and this action 5 is effected in a continuous manner.

It will of course be understood that the form, dimensions, details and materials employed in the construction of my apparatus may vary without in any wise affecting the principle of my invention. Thus for example the reciprocating movement of the two pistons may be converted into a circular movement and they 10 may be operated by a motor of any suitable kind. I also reserve to myself the right of replacing the two pistons or the two membranes by a rotary pump; in this case the air reservoir may be omitted.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what 15 I claim is:—

A portable apparatus for creating a vacuum, comprising a water ejector to which water under pressure is supplied in a continuous manner by the action of any convenient type of pump, or pumps, which may be suction and forcing, rotary or other pumps, so arranged as to cause the same water to return always to its 20 starting point and thus form an uninterrupted and closed circuit, substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 14th day of June 1900.

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Agents for the Applicant.

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[This Drawing is a reproduction of the Original on a reduced scale.]

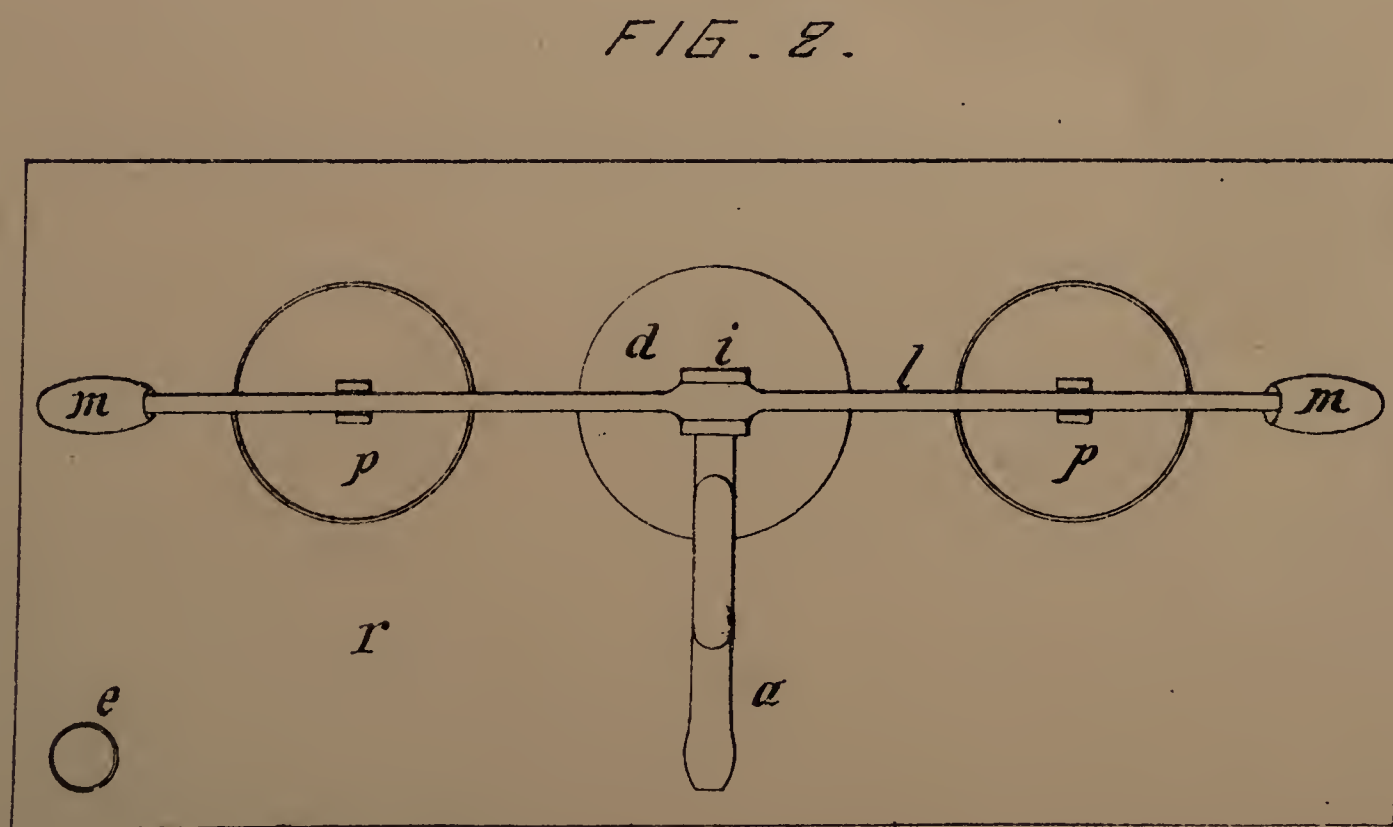
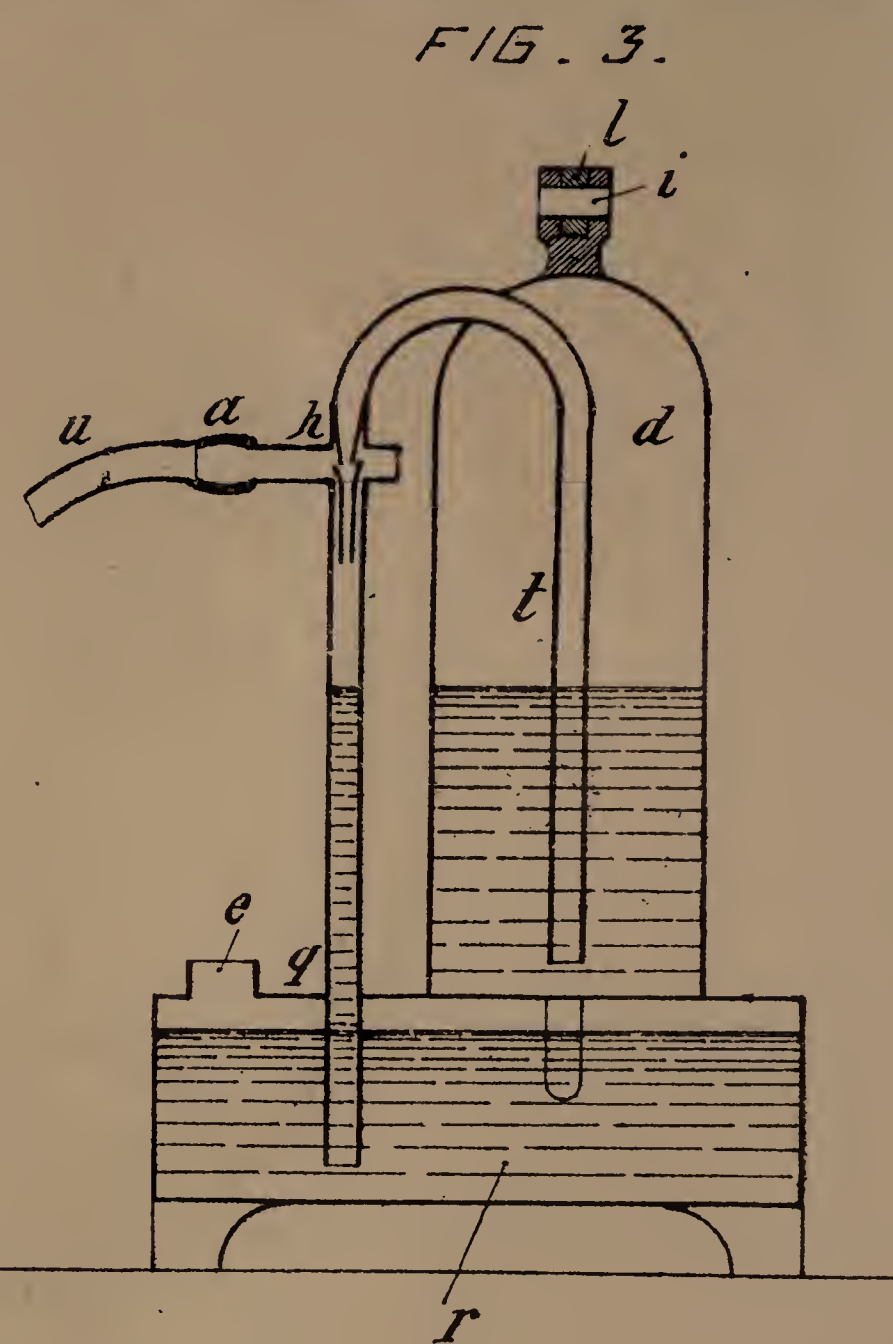
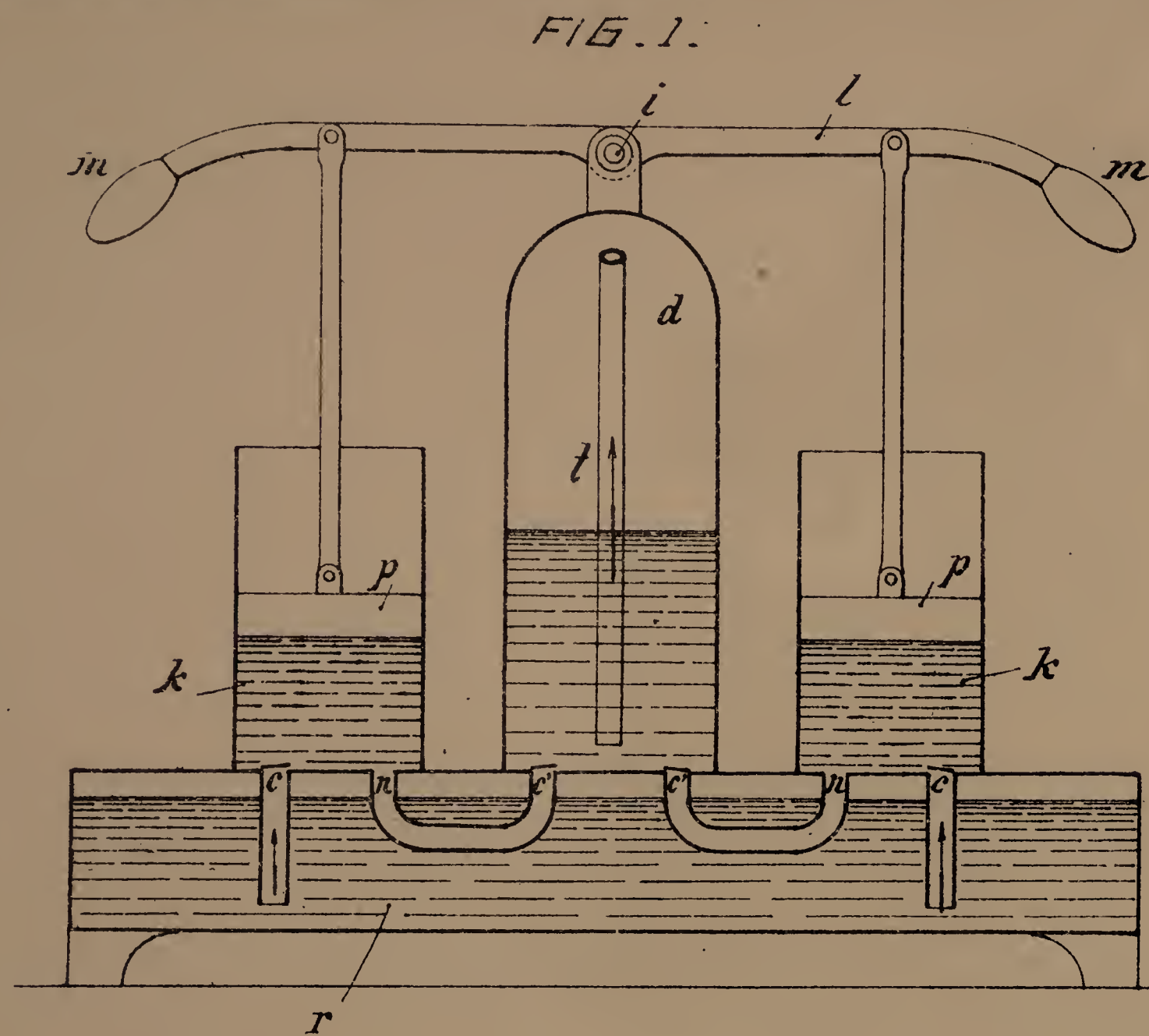


FIG. 4.

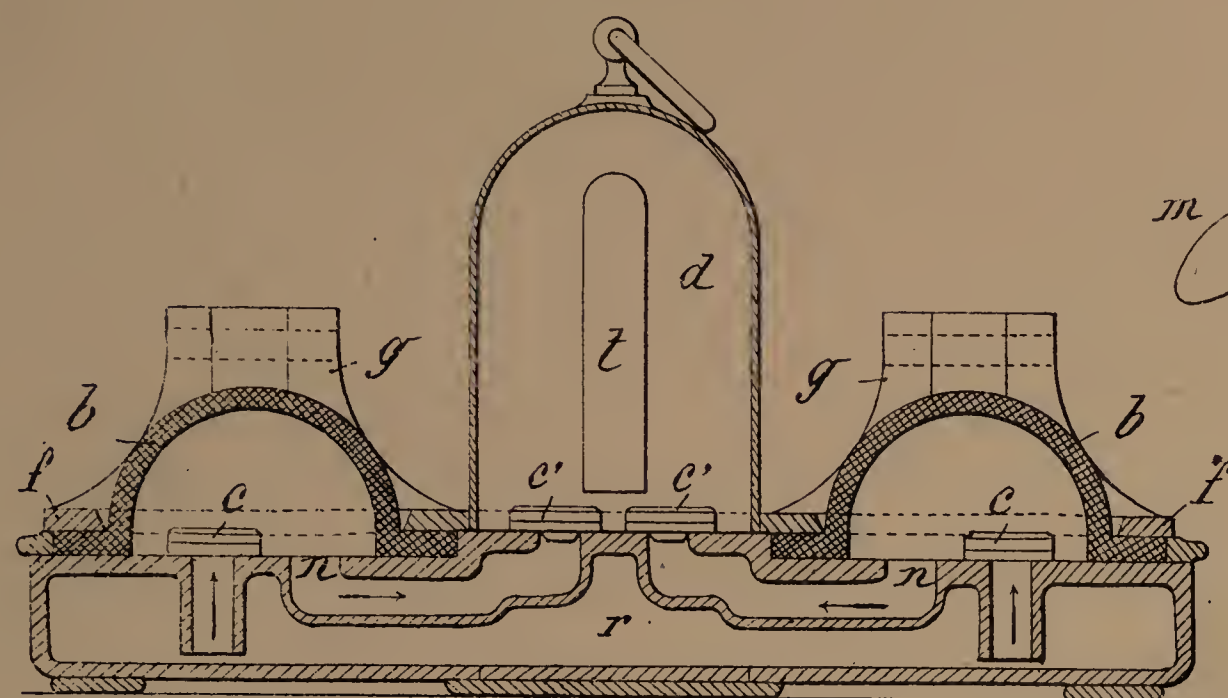


FIG. 5.

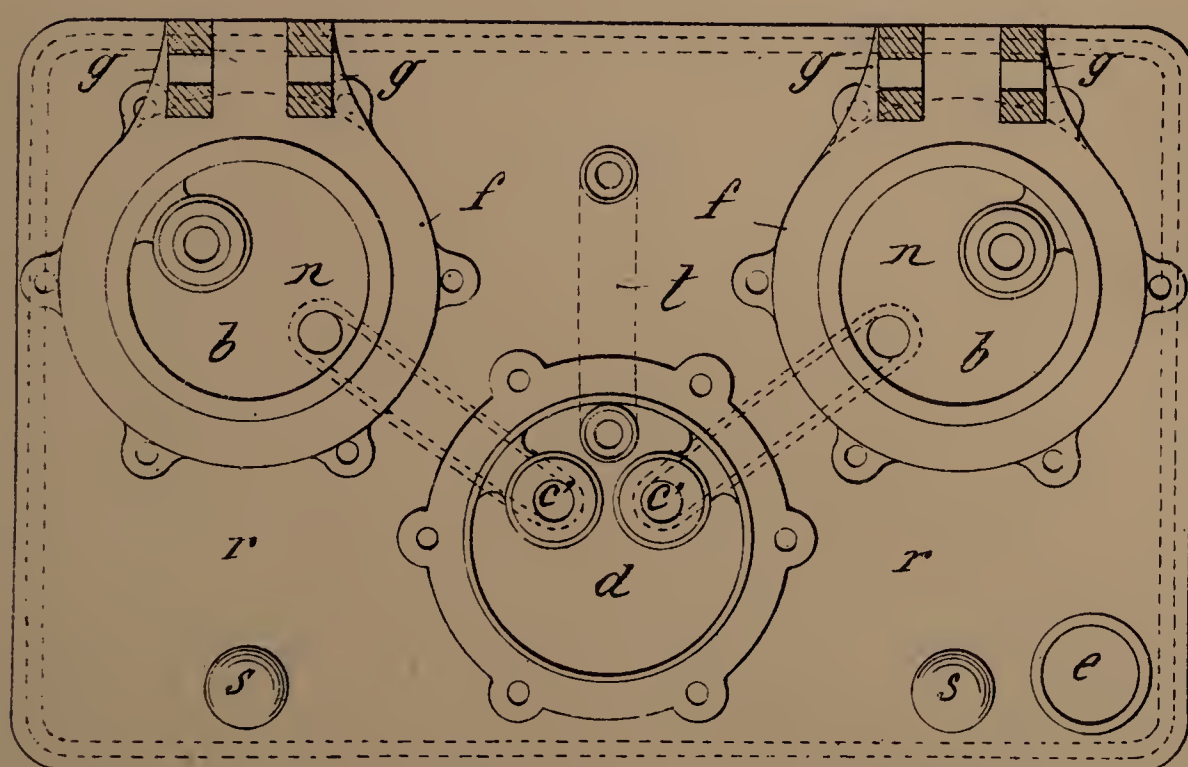


FIG. 6.

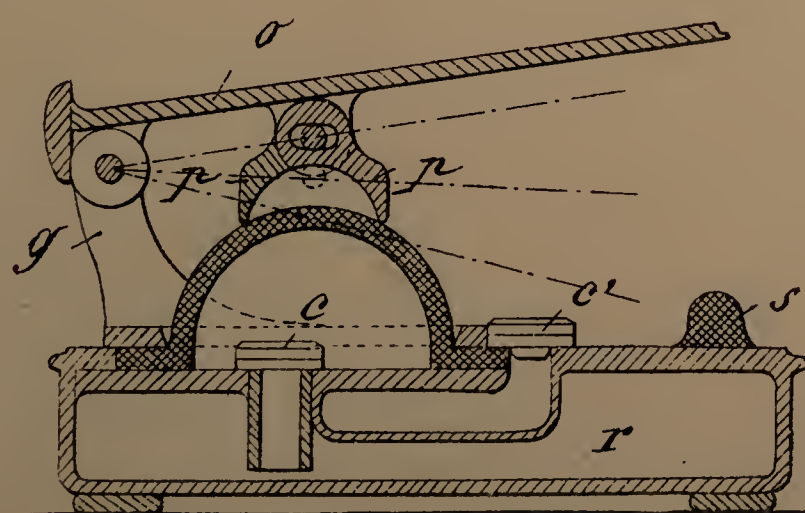


FIG. 1.

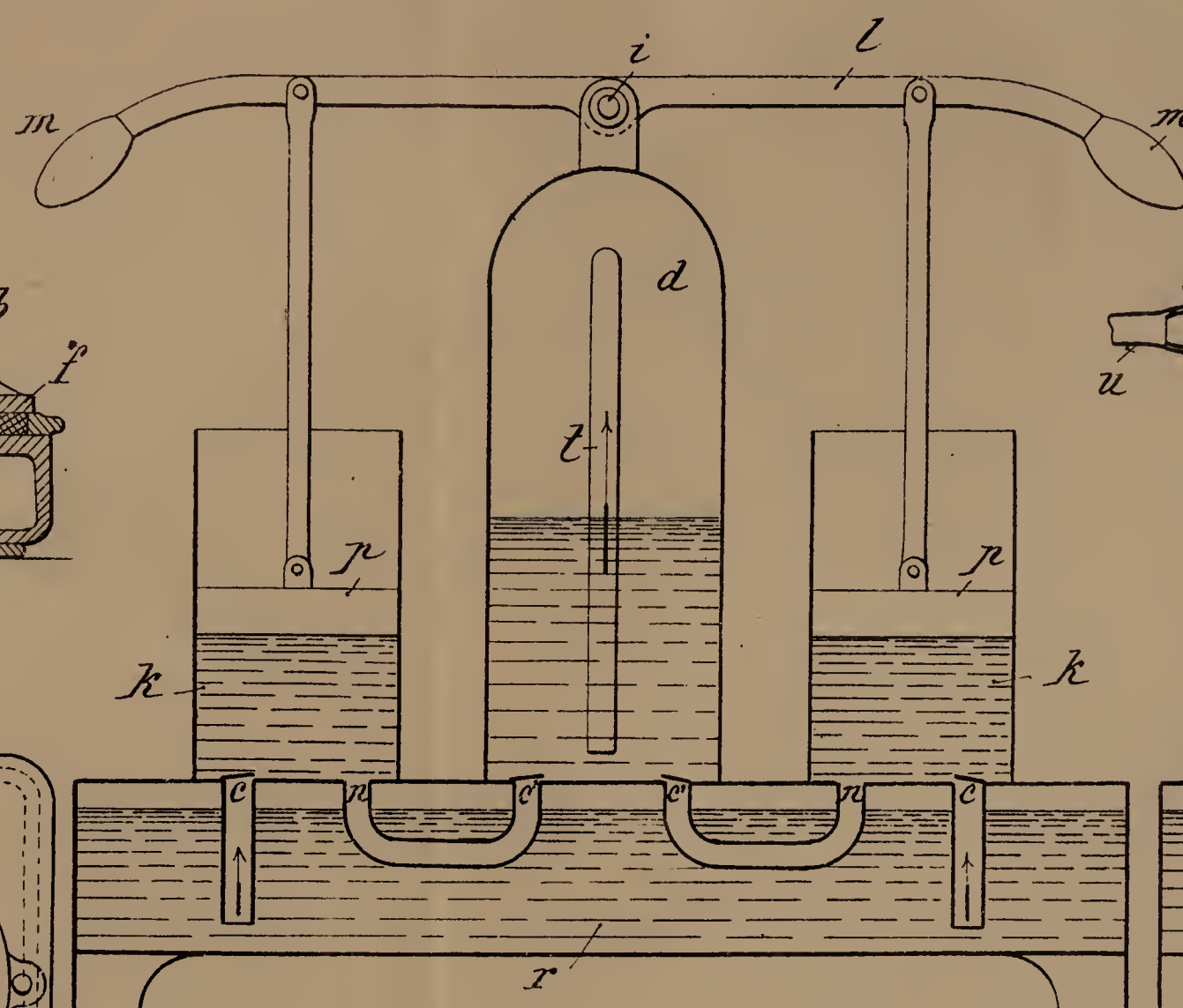


FIG. 3.

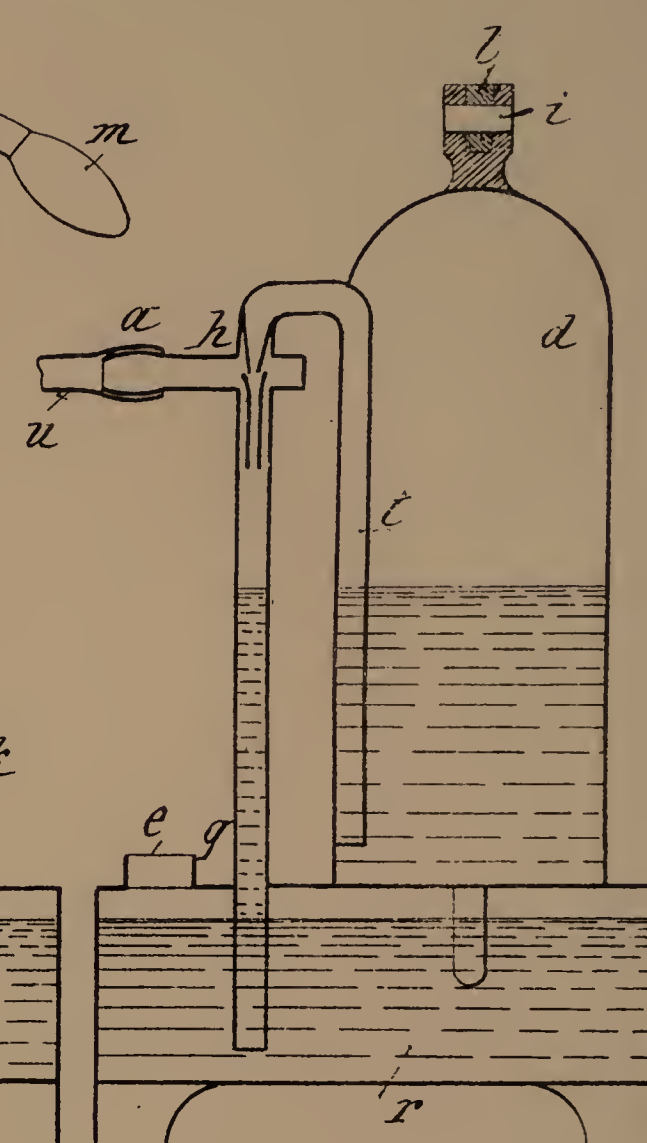
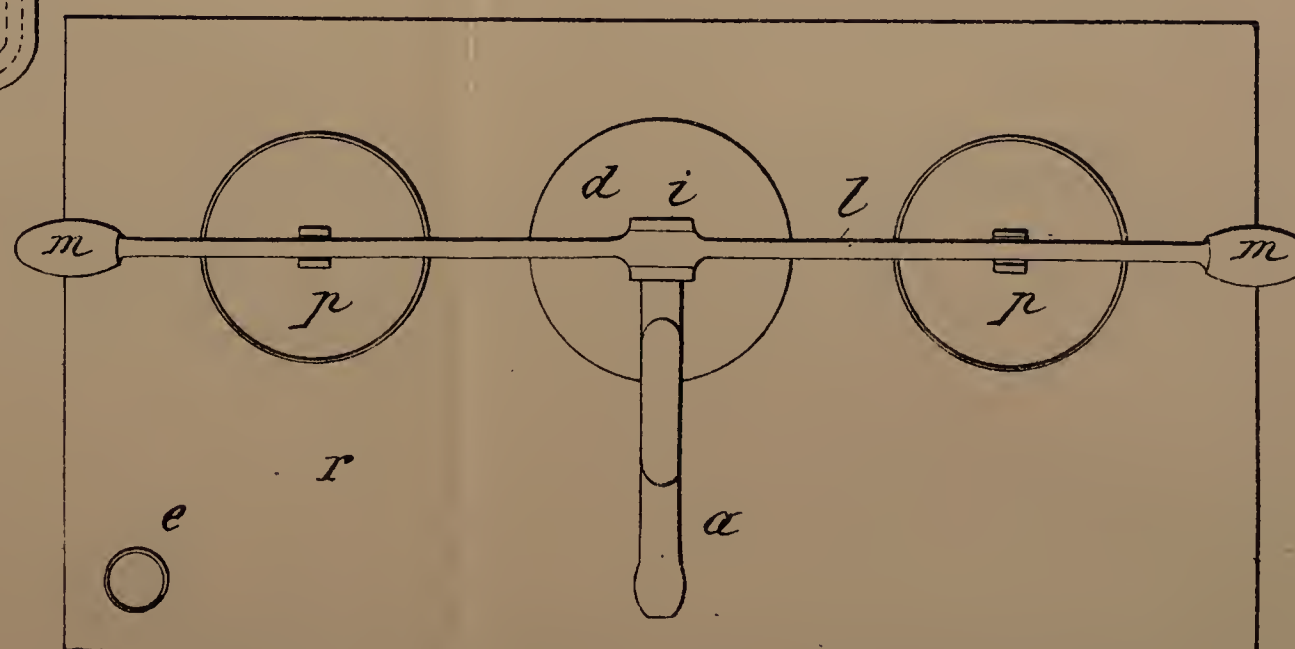


FIG. 2.



[This Drawing is a reproduction of the Original on a reduced scale]

